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# Teaching in the Army

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# Teaching in the Army

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## TEACHING IN THE ARMY

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# Teaching in the Army

By

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Teaching in the Army

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G. E. P.

## PREFACE

The achievement of the American army in converting raw recruits into soldiers in an incredibly short time was one of the most impressive facts in the history of the war. This achievement was due to the earnestness with which officers and men attacked the problems of military training. The new men studied and drilled with a devotion never before seen in any kind of a training school and the officers went about their work without sparing themselves in any degree.

In spite of all the spirit and energy exhibited, it was apparent again and again to observing officers and also to some of the men that valuable time was lost and energy was wasted because instructors did not know how to get their directions to the men in the best possible way or how to arrange the most effective drills. Officers realized when the war closed that they had discovered in many matters better ways of doing their work as instructors than they knew before, and that these better ways contributed to economy and dispatch.

In this experience the army went through exactly the same line of development as have the schools of every country and every age. Schools find that they do their work best after experience has refined their methods of teaching.

The experience gained by the army ought certainly to be written down. It is this belief which has prompted Major Lewis to undertake the preparation of a book on methods of teaching in the army. This book is the result of a broad contact with army instruction. It is more than that, it is a critical analysis of the experience gained in

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army training camps. The author came to his task with an unusual preparation to participate in the giving of instruction and to discover those refinements in method which would improve it. He has grasped the significance of a great many concrete situations and has put the kernel of these situations in such definite, straightforward terms that anyone engaged in army training can profit by his analyses.

The book is a most encouraging symptom of the movement to improve teaching technique in the army. It ought to get very wide use. It is also a striking example of the possibility of applying the modern methods of general education to a special form of instruction.

CHARLES HUBBARD JUDD

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# CHAPTER I

## INTRODUCTION

### 1. The need for teaching ability

Every man, when he finishes his courses at academy, college, technical school, or high school, has in mind the idea that he is finished with study and is at last ready to do some kind of real work. No matter where he goes, however, whether into a profession, business, or trade, he finds that study has just begun in a different sense. As he advances in his work, another factor becomes a part of his daily routine, and the better he succeeds in meeting this new demand the more successful he finds himself. That is, when he is put in positions of authority he finds it necessary to impart to others, perhaps his subordinates, the knowledge he has acquired, ways of doing office work, methods of salesmanship, methods of thought, and what not; in other words he has to become a teacher of a kind, training other people perhaps to work for him.

a) *Army experience.*—We have just had some share in the greatest war in history, but has our part in it turned out just as we expected? What was the usual run of experience? We went to school. After that we organized schools—non-commissioned officers' schools, schools for special details, schools for gun-squad drill, dismounted drill, equitation, all kinds of schools—and we were face to face with the old proposition of teaching probably even more directly than ever before. We learned that most army work is teaching, training, and studying. Even those who had the good fortune to go to the other side and take part in the actual fighting will recall that most of the time in France was

spent in either studying or teaching. Now many officers and enlisted men are in school again for the purpose of acquiring more of the necessary information which they will impart to others. The more we see of army work the more we are of the opinion that while a good teacher may not make a good officer, a good officer needs to be a good teacher.

b) *The new army.*—President Eliot, of Harvard, is quoted as having said recently that one of the greatest needs of the army is teachers. After Plattsburg, commanding organizations for some time, studying and instructing at Fort Sill, and instructing in the Field Artillery Central Officers Training School and the Field Artillery School, Camp Zachary Taylor, the writer has been impressed with the differences in ability between different officers to impart to others the things they know themselves. In the training schools there was a constant sifting and picking of men with this ability, and they were hard to find. Why? One can imagine the difficulty that confronted the organizers of some of the present schools when it became necessary to select instructors for them. If any officer will look back over his experiences at firing centers and elsewhere, he will remember the relatively few men who really could “put across” what they should in helping him to learn rather than leave him to learn everything for himself. If this need for instructors has been so great, it will not diminish. Whether or not we have compulsory military training, the new army is being organized into schools for different kinds of training both for officers and enlisted men, the army is becoming known as the “University in Khaki,” Reserve Officers’ Training Corps are becoming firmly established, and it is increasingly evident that there is a growing demand for officers qualified and able to instruct well.

## 2. Purpose of this manuscript

This brief introduction is sufficient to explain in part why the War Plans Division of the General Staff of the army has ordered that an integral part of courses for officers should be preparation to teach. To accomplish this several factors are of importance. First, officers must have an absolutely thorough knowledge of their work, and this is provided for by the thorough and basic character of the courses outlined for study; second, teaching done at the training centers must be of such a nature that it will serve as a model, to a great extent, for the teaching done by graduates, and to this end it must be constantly improved; third, instructors and students will take a thorough, basic, and practical course in the principles of teaching and of training which will aid them not only in their own teaching, but will also tend to make them competent judges of good teaching so that they will be able to pick out quickly the real faults of a poor teacher and apply the remedies most suitable.

For years men of ability have been studying this subject in all parts of the world, and it is the purpose of this manuscript to collect and to present in condensed form many of the useful and concrete conclusions which actual experience has brought to the attention of leading educators, in the army and out. Possibly the contents, supplemented by more exhaustive publications suggested in the index, may be made the basis of a course in the principles of teaching. Such a course given by the author in the Field Artillery School, Camp Zachary Taylor, included, first, a discussion of the principles of teaching; second, practice in instructing various classes by the student officers in the school, who planned and held complete recitations; third, a more detailed study of rating and grading methods; and fourth, practice in planning complete courses of study and time

schedules for certain subjects taught in regular organizations. Similar courses to be given during the summer of 1920 will suggest revisions in the text, and especially changes in detailed illustrations from successful methods employed in various branches of the service.



## CHAPTER II

### REQUIREMENTS OF A GOOD INSTRUCTOR

#### 1. Knowledge of the subject

The first requirement of a good instructor is a sound knowledge of his subject. Mastery is a goal set for every soldier, and he must learn to despise superficial knowledge, sloppy execution, bluffing, and "passing the buck." During the war few were the officers whose knowledge of their subjects was so thorough that their answers to questions could be depended on to be absolutely correct, clear, and concise. Knowing thoroughly the details of one's business is so widely accepted a requisite of success in any kind of work that it may seem unworthy of further discussion, but it is desirable here to analyze the exact ways in which each principle may be applied to the particular subject of teaching and why it is essential.

a) *Freedom to teach.*—It is absolutely necessary that the instructor be entirely familiar with the subject covered in a day's recitation if his class is to do good work during that recitation. Without such knowledge he is not free to teach; he cannot give his attention to the class, to its attitude and method of thought, but is constantly bothered with his own shortcomings. One of the big tasks of teaching is keeping in intimate touch with the ways in which the minds of students are thinking so that the necessary stimulus and assistance can be given. When one is uncertain of his subject, the questions asked or the difficulties of explaining keep his mind so occupied that he cannot concentrate on the reactions of the class, and his work is likely to be a failure.

b) *Understanding the difficulties of the student.*—Time and again instructors fail to answer questions asked by their classes because they do not understand the real difficulties which lie at the base of the questions, and their explanations cannot satisfy the students who ask the questions for this very reason. For example, classes in gunnery often fail in trying to determine whether a target beyond a hill can be reached because they do not realize that the drop of the projectile in traveling to the crest equals the angle of departure for the range to the crest. A common failure to appreciate difficulties is seen in teaching equitation where an improper position of the back is often caused because the ankles of the rider are held stiffly. A complete knowledge of the relation of all parts of the body in riding is required for immediate assistance in this case. A thorough knowledge is necessary so that the instructor may appreciate the difficulties of his students.

c) *Confidence and methods of approach.*—A third result of thorough knowledge is confidence, a requisite of more importance in the army than in most other professions. This is confidence both in your own knowledge and in your ability to teach, because it gives so many methods of approach to problems. When a student finds a difficulty very great, you have on hand illustrations which will clear up the matter to him, and soon he gains confidence in you and in himself. Methods of approach and illustrations are discussed in a succeeding chapter. Here it may be said that the more of an authority an instructor is in any subject, the better he can teach it, other things being equal.

## **2. A sympathetic attitude**

a) *Meaning.*—It is not necessary, however, to be an absolute authority on the whole of a subject in order to teach it well, for it is easy to recall that many of the best

teachers in college or elsewhere were young men, full of enthusiasm, who were not the authorities that some of the older and less successful instructors were. In the Field Artillery Central Officers Training School the writer was called upon at one time to select the best instructors in the department of gunnery, and of the ten selected, three had taken only the course given in that school and had never been to Fort Sill, or elsewhere, to get a more thorough training. A reason for this was, as we say, that these young men understood so well the difficulties and the mental attitude of their students. An instructor has a different point of view toward his subject from that of his students because he knows it and tries to give them like knowledge, while both the subject and the teacher are strange to the class. A good teacher is able to, and does, look at things through the eyes of his class; if he fails to do this he becomes a driver and not a leader, and sooner or later he is bound to fail. This point of view is what is meant by a sympathetic attitude. It is a requisite of a great leader in any occupation; and it is a basic requirement of good teaching because without it proper methods of approaching new or old problems are often missed entirely.

b) *Individual differences of students.*—Individuals in classes vary greatly in their ability in the same subject and in different subjects.

If the class were made up of all men or of a large number of men selected at random, the variation in ability in any particular study would be expressed by a graph much like the accompanying,

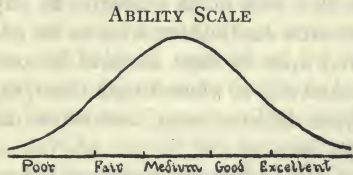


FIG. 1.—Normal distribution curve.

called the "Normal Distribution Curve." This curve merely indicates

(1) that men vary in ability, the amount of variation being shown by the length of the curve; (2) that there is a point in the ability scale, near the average, the point where the middle man will stand above and below whom there is an equal number of men, about which point the great majority of men are grouped in ability, as shown by the height of the curve at and near this point; (3) that the number of men of very much greater or of very much less ability is comparatively small.

c) *Application.*—This variation in ability must be considered in teaching classes. (1) First, instruction should be prepared for the man somewhat below the median if it is to benefit the larger part of the class; (2) second, very bright students need opportunity for extra work while very slow students need extra help or grouping in separate sections.

Classes are never so perfectly ranged in ability as in this graph. They may be a selected group so that their median or middle ability is very high, but in all cases there is a somewhat similar curve to be considered. Reserve Officers Training Corps instructors and instructors of officers will find a wide range of ability. It is sometimes hard for a very bright instructor to have patience with slow progress, sometimes for a slow teacher to have patience with a very quick student. In any case an understanding of such distribution adds to an understanding of the class and must be kept in mind in considering questions to be asked and of whom to ask them, the kind of work probable from different men, and other details of the work of a teacher.

d) *Determining individual differences.*—How can an instructor obtain such a graph of ability for his class? The best way is to take the marks or grades given members and form a graph for the class. These marks are his

best judgment of the pupil made from time to time. Suppose the following to be a set of ratings for a class of eighty-nine students:

| No. of Students | Rating           |
|-----------------|------------------|
| 4.....          | A (91-100)       |
| 11.....         | B (81-90)        |
| 40.....         | C (71-80)        |
| 20.....         | D (61-70)        |
| 14.....         | E (60 and below) |

These figures would be represented by the following graph:

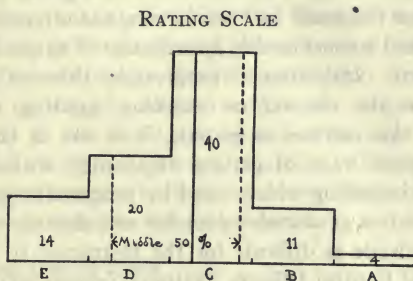


FIG. 2.—Graph showing distribution of class marks, eighty-nine students.

Each block represents by its height the number receiving the grade below it. Since there are eighty-nine in the class, No. 45 from the bottom or from the top, arranged in order of merit, is the middle man, represented by the solid, light line. By counting the numbers in the blocks it is seen that No. 45 falls in the Grade C group. The middle 50 per cent of the class includes twenty-two men on each side of No. 45, so according to the grades the middle half extends from well down in the Grade D group not quite up to the Grade B group, as indicated by the dotted lines. Now the instructor looks up any man in his class, say

Mr. X, and finds his mark is B, so he says X is in the upper fourth or quartile of the class. Mr. Y may be marked E, so he is in the lower fourth, or quartile, and needs special aid. Z is marked D and probably falls in the middle 50 per cent. Instruction in class should reach at least the upper three-fourths, so the instructor can test its success by referring it to some Group D or second quartile man, or possibly to a Group E or lower quartile man.

Such a study of students can be made in ten minutes. Sometimes the names of students in each group are written in or below the grade for their blocks, and often the instructor will find a considerable interchange of names before the year is out. Indication of progress by this method is discussed in the chapter on marking, grading, or rating. Because this method is graphic, it is one of the clearest and simplest ways of getting acquainted with the class, and it is becoming widely used by progressive instructors.

e) *Reaction of attitude on teacher and student.*—A sympathetic attitude is difficult for the instructor to maintain. When the Central Officers Training Schools were running at full blast, it was brought to the attention of the directors and battalion commanders of one of them which contained over 13,000 students that while the students seemed to be working to the best of their ability, large numbers of them were advising their friends at home not to enter, though claiming that they themselves were getting along very well, as they were. One of the chief causes for this feeling was given as the attitude of a number of the instructors, who had been instructing in army schools from the beginning of the war, with the natural result that they had become drivers and not leaders. The students who entered the school were eager and anxious to work as hard as they possibly could, and this attitude on the part of the instructors was out of place, especially in the case of such men.

It was partly for this reason that some other armies found it advisable to retain officers as instructors for a shorter length of time, then putting them on duty with troops. The losing of a sympathetic attitude is a cause of the souring of a number of teachers and of that rather strained look which leads to the remark occasionally heard, "You can tell a teacher as soon as you see one." On the other hand, constantly keeping in touch with the viewpoint of the members of his classes will enable an instructor to do away almost entirely with sarcasm and ridicule; almost, because there sometimes arises the "smart" case which may need it, but even then a young teacher can seldom use them to advantage. In this connection it is hardly necessary to suggest that no soldier has respect for an officer who is not military, speaking directly what he means and forceful in word and action. The ability to look through the eyes of others is not unsoldierly, and it can be developed with practice and experience.

### **3. Knowing how to teach**

The third requisite of a good teacher is knowing how to teach. Any officer who thinks back for a moment over his experiences during the past three years will recall mistakes he made in training men, and how much easier it was to get desired results after a little experimentation, practice, and experience. One cause of this was, of course, that he knew more definitely what results he desired, in itself a requisite of good teaching. In the succeeding pages are collected and grouped about principles some of the results of such experience, and these will doubtless suggest many similar cases emphasizing the same ideas,

## CHAPTER III

### AROUSING INTEREST AND HOLDING ATTENTION

#### 1. Teaching judged by results, not by acts of instructor

Some years ago it fell to the lot of the writer to go with four others to survey the school system of Mount Clair, New Jersey, and a particular part of the report submitted had to do with teaching efficiency. We visited practically all classes in all schools, and there we learned this, that when visiting a classroom it was of great advantage to sit so that we could see the faces of students as well as the teacher. By doing so we could see the expression of the class and judge of its interest and attention. The point emphasized is that instructors are judged not so much by what they say or do, but by the *results* they get from their classes. Commanding officers judge their subordinates not so much by what they say or do as by the way their organizations perform their duties. An instructor is not excused by dubbing his class a lot of "blockheads"; it was given him to get results. A section was learning firing battery drill; at first glance the officer-instructor seemed poor, his voice rather low, even his personal appearance not as good as it should have been; and the inspector, a well-known officer, approached all ready to criticize. To his surprise the men were moving swiftly and silently, all settings were accurate and prompt, the work was quickly checked, every man was so hard at work that even the inspector was unseen. The outcome? The inspector personally commended the instructor and recommended him for certain advancement because his class was getting results.



## 2. How to arouse interest

Since instruction is judged by the work of the class, it is a common saying that a good instructor is interesting and stimulating, and holds the attention of his class. It is not difficult to arouse interest temporarily, as at the first recitation, but it is important that this interest be aroused. Merely a quick movement, a short silence, a drawing, many little things will do this. But all of us are witnesses to the fact that interest may die quickly, and a class may get to the condition where it expects a certain instructor to be uninteresting, and consequently he will find it difficult to arouse even temporary interest. We are familiar with the methods used by Billy Sunday to arouse and hold interest, but most of these methods the ordinary instructor is incapable of using and some of them he would not use if he could. The following suggestions are useful in getting interest at the beginning of the class.

a) *Be prompt and prepared.*—Attention is often killed by dilly-dallying at the first of an hour. Time lost in getting reports, in calling rolls, in getting seated, and in other ways is harmful. Get this systematized. Some common ways of doing this are as follows: (1) Have a numbered seat assigned to each student and appoint some student to hand in after class a check of empty seats and late arrivals. (2) Assign numbers to students and have them count off. (3) Each section marcher reports orally to the senior marcher and hands in list of absentees with causes of absence, and the senior reports orally to the instructor. Some instructors will not appear before their classes until all reports are in and the class ready for work, when they step up in front and start the day's work with a swing. Everybody knows that when the instructor appears things are going to happen. Being prepared to start, starting on time, and where you intend is a good beginning.

b) *Be enthusiastic.*—Enthusiasm always attracts attention and, properly applied, holds it. Enthusiasm does not mean a constant bubbling over of superlatives which destroy attention, but rather a deep feeling of the value of the work in hand, developed by real preparation and interested effort on the part of the instructor. An enthusiastic instructor is always able to say more about his subject than the allotted time permits; his enthusiasm is contagious, his class will be interested, and the end of the period will come all too soon.

c) *A definite purpose or a challenge draws interest.*—There was one class in law in the Field Artillery School, Camp Zachary Taylor, in which the instructor began the day's work by stating or having stated clearly the problem for the day, and enumerating the parts as they were to be taken up in the recitation. Everyone was immediately all attention. When he was giving a lecture it was noticeable that notebooks and pencils were in immediate demand, and the mere statement of the challenging interesting problems that were to be brought up in the class aroused the attention of its members. Such a clear understanding by the class of what the recitation is about is accepted as a requisite of good teaching. It can be developed only as the result of forethought and planning on the part of the instructor. The value of an interesting purpose at the beginning of a period is illustrated by the added interest of a reader in a chapter whose purpose is clearly defined in the first paragraph. A further discussion of the use of problems may be found in this chapter under "How to Hold Attention" and in the discussion of assignments.

### 3. How to hold attention

While it is comparatively easy to arouse attention, it is much more difficult to hold it. Consciousness is a

moving stream and can never be held fixed for any length of time. Suppose you are told to fix your attention on a spot on a blackboard for five minutes. You will find it impossible to do so. This is the way you might go about it: "That spot is white while the blackboard is black; it is pear-shaped; it is about two inches from the end of the board and about six inches from the top; it seems to have a yellow rim around it; etc." As long as you continue thinking about the different aspects of the point you can hold your attention on it. It is this changeableness of consciousness that makes it difficult for a class to continue at attention, because active attention means hard work and continuous application. It is impossible to hold attention by "stunts" even if they were desirable, but it is possible to analyze to some extent the causes of attentiveness and to suggest in a simple way some of the means of holding interest.

a) *Physical position.*—In the Field Artillery Central Officers Training School it was found that the formation of classes and the position in which the members were seated had something to do with their attitude of mind. The classes were held out of doors and the section marchers marched their sections in front of the instructor and gave the command, "Halt, left face, seats." This put the class in a regular and close formation facing the instructor. No one was allowed to lie down or to sit in a slouching position, and a strained position was likewise avoided by providing seats of a certain kind. Of course the important question of fresh air took care of itself under these circumstances.

An instructor standing dominates his class by his position above them, and it is necessary that while he is conducting the recitation he remain in a standing position. At the same time he must be careful that the light is not behind him so as to shine in the eyes of the class. When some

student is explaining blackboard work, the instructor either sits down or stands near the back of the class so that the domination is transferred to the student reciting and the recitation will be addressed to the students. To hold attention on the proper center of interest, have that center stand up, whether instructor or student.

b) *Movement*.—Movement always attracts attention and is a legitimate way of holding it. One grows tired of looking at a fixed object. Some time ago a group went to watch one of the most celebrated kindergarten teachers in the city of New York, having in mind the difficulty of holding the attention of a number of small children. After the children had been working for a little while they began to grow restless. Then the teacher stood up, walked slowly across the room to the blackboard and began drawing something. As soon as she began to move, every child in the room fixed his attention on her and kept watching her until she had finished. If the spot on the blackboard, mentioned above, should begin to move and make figure eights and spell words, one would have little difficulty in watching it for some time. When work is not in the form of lectures, movement by the students is most valuable. They should go to the board, illustrate what they are describing, or show what they mean, with the result that they pay more attention to each other. Movements to hold attention are best if they serve some purpose, such as illustrating the aids in riding, drawing a figure in gunnery, showing the parts being described in materiel, or acting out any maneuver which is being discussed.

c) *Variations*.—Variations in tone of voice and in rapidity aid in holding attention. Speak slowly when saying something important, but when giving an illustration or saying something less important, speak more rapidly.

Variations in point of view or of attack are extremely important. One day an instructor in equitation had been discussing in a lecture the various aids in jumping, showing how the horse must be made to gather his haunches under him before taking the jump. He considered the subject of so much importance that he spent some time on it, and the class began to grow restless. Suddenly he stopped, looked over the heads of the class, and said, "I remember a horse over in Manila—," and went on to tell his story of this horse which was a wonderful jumper; and the point of the whole story was that the horse gathered his haunches so well before jumping. As soon as he started this story, approaching his subject from a new point of view, the whole class became attentive again. Illustrations nearly always furnish a new approach to a subject; their use requires some discretion, however, lest the class carry away a number of stories and miss the point they are to emphasize.

*d) Using simplest methods of approach.*—The method of approach to a problem or to new material should be simple. To select the method of teaching most easily understood and remembered requires a very thorough knowledge of the difficulties of the subject and of the student. Semaphore can be learned easily by the group method, but the method grew from a careful study of the relationships of the subject. The "knee sprung" gait of some recruits which makes them bob up and down out of time with the remainder of the company can usually be cured by a little practice at the goose step. In artillery, deflection may be computed in many ways, but the simplest method for the student to grasp is the combination parallel method in which the offsets are computed as a whole and simply set off away from the guns, no matter whether left or right. Other methods can be built on this one. A

good course of study should suggest the best ways of meeting its main problems, and a successful teacher is always looking for the way most readily comprehended and most easily remembered.

e) *Visual instruction.*—In many instances the simplest method of instructing is showing how a thing is done, especially having students show each other. Thus it is customary to show the proper application of the aids in riding, or the proper salute in dismounted drill, or the dismounting of a gun in ordnance, after which the student tries it for himself and then studies the theory. It is not enough to show how to do a thing, but the class must try it for itself to really learn the difficulties, as is shown in the case of the three illustrations above. Moreover, it is only when the class applies its knowledge in practice that the instructor can judge of the success of his approach.

Too much emphasis cannot be laid on visual teaching. A large part of learning is through the eyes and a correspondingly large part of instruction must be through the same channels. In many classes the instructor who fails to use the blackboard is inexcusable. In studying the theory of motors, put a running outline of your conclusions on the blackboard; in conduct of fire, put angles and hills, and even guns, on the board; in topography show on the board the symbols, co-ordinates, ways of shading, etc. Seldom is this done enough or well enough. Everyone uses terrain boards, miniature ranges, and service ranges to teach advanced conduct of fire; but adjustable angles made of two sticks held by a wing nut are almost as useful in the early stages of computation, and field gunnery becomes a different subject with prepared appliances showing site, movable trajectory, or actual points of impact. "Seeing is believing" applies to teaching as to other phases of life. (See further discussion of visual instruction under "Drill.")

f) *Grouping work about interesting problems.*—A challenging problem is the basis of nearly all good individual application. The inventor who spends his nights and days working on some new idea, hardly stopping for meals, does so because he has in front of him some problem which he feels is worth working on. If the instructor bases the work of his class on problems which both he and the class feel to be worth while, he can always feel sure that the class is working with him. Every day's recitation must contain such problems requiring thought and attention, and these problems should be clear to the class, to insure which they are often stated definitely before being taken up for study.

Some illustrations of problems assigned for study may be of interest. (1) One class in geography was studying Brazil and the problem was, "Why has the trade between Brazil and the United States increased (so many) per cent during the past four years?" involving a study of the resources and products of each country. (2) A class in reconnaissance had occupied a new position and selected observation and reference points, so they were required to bring in battle maps in preparation for opening fire on various targets. Their sector had been laid out on a miniature range and the maps they prepared were used immediately in lateral observation in the course in conduct of fire. (3) A class in tactics was in two sections commanding opposing forces in a campaign. Having fought fairly evenly during the recitation period, they were left with the problem of obtaining the advantage on the next day. (4) A class in materiel learned that in the next period they must adjust their quadrants and fill recoil cylinders with oil, for which tasks they must be prepared.

These illustrations are simply a suggestion of how an instructor may have a class report to him in an attentive

frame of mind at the beginning of a recitation. To do this, he must have the students report to him with problems in their minds which are to be solved during the recitation period, if possible. The most successful teachers dismiss their classes with such problems, and the nature of the problems must be such as to arouse interest and cause study, a thing they can be depended upon to do when they involve practical application to a real task of some kind. Army work lends itself peculiarly to such tasks because most of it is of a very practical nature, and nearly all of it is studied for actual use. Even drill of various kinds, such as platoon or company drill, becomes deadly and useless in the mind of the student unless it can contain such problems calling for perfection of detail, and an instructor is not justified in simply executing "Squads Right" and "Squads Left" indefinitely as mere maneuvers.

It will not do to take for granted that the work being done supplies its own problems, but the instructor must be sure that the class knows a definite, valuable purpose in each day's recitation. Problems to be used in class work and in study are often put in the form of questions, and questions of this nature are not easy to answer. They are often asked by the students themselves. Such questions are discussed more fully under the subjects of "Questions" and of "Assignments."

g) *Competition or emulation.*—A spirit of competition injected into any study will hold attention. This spirit is used by practically all organizations, but in addition to having men compete against each other or against other organizations, it often proves to have even better results to have them compete against their own records. Only certain phases of this subject need discussion here.

Competition between individuals depends in part on their knowing the results of their work, and since results



are so often expressed by grades or marks, competition is increased if students know their marks.

A graphic representation of the standings of individuals or of units, such as those suggested in chapter ii and chapter viii, shows most clearly relative efficiency, and this method is growing in use in the army as well as in schools and colleges. There was one division during the war in which platoon chiefs rated their men monthly, showing the men excellent, good, fair, etc., in each subject; captains collected the results, majors summarized them for battalions, colonels for regiments, and brigade headquarters for brigades. Then the division commander had comparative graphs made and placed on his bulletin board. When brigade commanders reported to division headquarters they sometimes waxed warm over the comparison, though each knew the record fairly accurate and prepared by his own officers; and when the regimental commanders were assembled they were set to work in no uncertain terms to pass their competitors in subjects showing defeat.

Competition against others should be supplemented by competition against one's own record or against the squad or class record. In some school subjects there have been developed certain standard tests which are used in hundreds of schools as the basis for graphs for each student, showing his progress from month to month. These are intensely interesting and are practically always encouraging, since work on a subject brings improvement. Some suggestions along this line are found under the subject of "Grading." This branch of competition is worthy of much greater use in the army and is now employed in some army schools and in some units of the R.O.T.C.

*h) Allowing students to use their brains.*—It is the besetting sin of some instructors to overlook the fact that students want to use their own brains. A number of

student officers at Camp Taylor held recitations as a part of their course in principles of teaching, and it was very noticeable that many of them were so anxious to get exactly correct answers from their classes that they interrupted the students reciting and suggested to them the correct answers to questions. It would have been far better to have made the student rely on himself and to have waited for him to give his answer in the best way he could. This fault is almost universal. Classes are not for teachers, but for students. Some instructors make their classes, especially their lectures, almost unbearable by going into all details, so that they do all the thinking for their students. In order to get the best work from a class, note the big difficulties in the way of a thorough understanding of the subject, if necessary present the difficulty in the form of a challenging problem, and put it up to the class to solve the difficulty in its own discussion. Never be afraid to let a class work as hard as it wants to on such a task, and often when it is unable to finish it in one day, leave the problem over until next time. When the class learns with the instructor's aid that it can work and work well, that individual ideas are expected and appreciated by teacher and students, it will enjoy the satisfaction of successful work and its members will become thoughtful, independent students. When most questions are referred to the teacher and answered by him, these results cannot be expected.

i) *Personal attitude of the instructor.*—The foregoing discussion emphasizes the statement that an instructor always tries to keep in close touch with his class. If he is delivering a lecture, it is often difficult to know whether he has the attention of a large section. In this case the individual idea is a good one. Select some member of the group and talk directly to him; watch the effect on him;

if a funny illustration is used see if he laughs. If the lecture is "taking" on him, pick out a different student in a different part of the room and try it out on him. By keeping in touch with individuals one gets a good idea of the thought of the whole class. In recitations the same rule applies. The work of the class is the paramount consideration. Members are seated to aid their work; illustrations are selected in view of their effect; methods of approach depend on the mental status of the students; problems of interest are developed and competition is fostered to hold interest; and the whole learning process can be complete only if students grow to think independently and to the point, sometimes guided by the instructor and sometimes using him as a reference, until they reach the point where they can stand on their own feet, and lead others about them in practical or theoretical production.

## CHAPTER IV

### QUESTIONS AND ANSWERS

The question-and-answer method is the usual form for holding a recitation. In olden times the students asked questions of the instructor, whose part it was to answer them; nowadays the opposite custom often prevails. A combination of the two methods is generally aimed at by a good instructor, but even this is not enough. It is just as important to have students ask questions of each other as it is to have them ask questions of the instructor. The two natural heads under which questions fall are those asked by the instructor and those asked by the students. The former have three purposes, the first and primary being to stimulate thought, the second to test for knowledge, and the third to emphasize facts already known to the class.

#### 1. Questions by instructors

a) *Mechanical requirements of good questions.*—There are several so-called mechanical requirements of questions. (1) They must be asked in a clear, loud tone of voice, with distinct enunciation, so that every member of the class can hear and understand them. While this requirement is obvious, it is surprising to note the large number of instructors who fail in this very point, so that many members of their classes often do not know what is being discussed.

(2) Questions should be asked before designating an individual to answer them, insuring the attention of the whole class and relieving any particular individual of the strain which might otherwise result.

(3) Avoid calling on students in a regular order. Have you ever seen an instructor who has an alphabetical list of his class and who calls upon them in alphabetical order? If one's name begins with A, he can rest in peace after the first part of the alphabet has been covered and know that he will have nothing to say for some days to come. Other instructors have the habit of calling on students in the order in which they are seated, with the same bad result, and it would be possible for a man with an alert mind and a lazy temperament to move about the class in such a way that he would be seldom called on.

(4) Sometimes the instructor forms the habit of calling upon bright students to the exclusion of others. One day the writer visited a class in conduct of fire in which problems were being fired on a terrain board. A question came up and the instructor called on a student to his left, who answered very well. In a few minutes a second question arose, the same student was called on and he answered even better. When a third question was referred to the same man I interrupted and asked that another be called on. The second man answered, when to my surprise the instructor asked the one who had been reciting so frequently, if he thought the answer correct. Evidently this officer had formed the habit of calling on one or two bright members of his class to do most of the reciting, hoping that their answers would "soak in" on the rest of the class. A man will usually learn more when called upon to express his own ideas than when simply listening to the ideas of others. In this connection it might be mentioned that an instructor sometimes knows the names of only a few members of his section, and if he is not careful he will find that these members are doing most of the reciting.

(5) Questions should not be repeated unless they are not understood by the class, and they should be understood.

Repeating has two bad results: it detracts from the attention paid the first question, and in case of a difficult question requiring thought, it is often asked the second time in a different form from the first so as to cause confusion to a thoughtful student.

(6) Questions must be clear and definite, so far as possible having only one meaning.

(7) If questions are framed in a novel form it is found that they stimulate thought, while questions of some old stereotyped form tend to have the opposite effect.

*b) Content requirements of good questions.*—(1) Questions with predetermined answers. Often an instructor asks a question to which he has a definite answer fixed in his mind, which answer he tries to persuade some member of the class to give him in his own exact words. This leads the class to guess at what is in the mind of their teacher and will result in the destruction of individual thought and finally in a loss of interest in any question such an instructor may ask.

If the discussion by the class contains a good answer which the instructor finds it necessary to express in some simple terms, he should of course do so in many cases; but at the same time he must recognize the value of good answers and constantly prevent the tendency of the class to try to guess at what he wants them to say. Except in the case of definitions, it is usually best not even to try to force the class to answer questions in some previously conceived form.

(2) Difficulty proportioned to ability of class. One officer studying principles of teaching was called on to teach a class in mathematics on the theory of exponents. His first question was, "What is the law of positive integral exponents?" The eighth man called on succeeded in giving some kind of an answer to the question. A second

officer in the same course taught the same lesson to a different section. His first question was something like this, "If you multiply a letter by itself, how do you find the exponent of the result?" The three other parts of the law of exponents were taken up in the same way, and different members of the class succeeded in both answering the questions and illustrating them, while another student combined the answers into the complete law. The first question was too hard; the second questions called for the same information, required thought, especially in the illustrations, obtained the desired results, took less time, and so were much better fitted to the class.

On the other hand it is possible to ask questions which are so easy as to require no thought. Whenever an instructor asks many questions in rapid succession, receiving many answers such as "Yes" and "No," it is fairly certain that the questions are poor and should never be asked. If such questions could be combined into one question requiring some thought and discussion, the result might be worth while. If the instructor is asking fact questions, for example calling for definitions or asking for the names of the parts of a gun, the questions are bound to be easy and should require very little time for an answer. Except in this case such a question is better omitted.

(3) Sufficient scope. It can be said, then, that if a question is to stimulate thought it must be of sufficient scope to require thought, and in this case the instructor may expect a short time to elapse before receiving an answer. Often when such a question is asked it is followed by a period of complete silence on the part of the class while they are thinking of the possible answer they may give. It usually requires considerable thought and preparation on the part of the instructor to prepare such questions. Before going to the classroom he should write down four

or five pivotal questions to be used in the recitation, about which the whole thought of the day's assignment hinges. Absence of such questions indicates lack of preparation. When the instructor starts doing this, it seems to him that he is preparing a sort of examination on the lesson.

For example, a class in topography was near the first of the course. The following questions covered the day's recitation:

1. Distinguish between the different types of area sketches and reconnaissance sketches. This provided for review.

2. What are the three respects in which two points on a map are related to each other? Distance, direction, elevation—illustrate.

3. What means are in common use for measuring distance, direction, and elevation? Illustrate from map.

4. What is placed in the title of a sketch?

5. Where are the title and the scales usually placed on a sketch?

By means of such an organization of questions the class can get the idea that most of their work, especially of their study, can be organized and grouped about the big ideas or main topics of the lesson, and they will be well along their way toward efficient study and excellent individual thought.

c). *A test for the quality of questions.*—One of the best tests of questions which are asked by an instructor is this, Do they lead to questions on the part of the class? Professor Strayer, of Columbia University, says, "Questions by an instructor which do not lead to questioning by students are unsatisfactory." A further discussion of this requirement is carried on under the topic of questions by students.

## 2. Questions by students

a) *Teaching judged by questions asked by students.*—In the discussion of questions asked by students, we must



consider what kinds of questions should be asked, why they should be asked, and to what extent the instructor is responsible for obtaining them. It is stated above that questions by the instructor which do not lead to questions by his class are unsatisfactory. This emphasizes in a new way the idea which is basic in obtaining an attentive class, namely, that the center of interest in teaching is in the class and not in the teacher, and that the object of instruction is to have a class of successful workers rather than a working teacher. The questions asked by a class are one of the very best indexes of the work of the class.

The instructor needs to have his students ask questions to help him judge the progress of his class. Many a time he will be asked a question which he thinks has already been answered to the satisfaction of the class, only to find that a large number of his students have never really grasped the point. For example, in a class in motors the other day, after a complete discussion of the operation of valves for the inlet of gas and the outlet of the exploded mixture, with lantern slides to illustrate the complete movement and a sectionalized engine for practical demonstration, one student asked, "Sir, of course I understand the action of these valves, but I would like to know just when it is that both the inlet and the exhaust valves are open at the same time." At times, also, students will ask questions which will remind the instructor of some idea which he has entirely forgotten to bring up in his class work, although it may be of considerable importance. When the class is asking thoughtful questions the instructor knows that he has a thoughtful class, otherwise he may be fairly certain that the reverse is true. Just as a small child who is learning is interested in things and is constantly asking questions, so an interested class will be full of questions which they either want to answer for themselves or need someone else to answer for them.

b) *Questions must be heard.*—It is necessary to emphasize the importance of having all questions asked by students heard by the whole class. Too often in every school does a member of a class who sits near the instructor ask a question in a low tone of voice so that many of the section cannot hear what he says. The result is that other members of the class are not interested in the ensuing discussion and tend to lose interest in the general idea of asking questions. If the class is to work together, they must develop the habit of expecting, even demanding, to hear everything that is said because nothing is going to be said in the class which is not worth hearing. If a question cannot be heard, the class will demand its repetition or the instructor will do so.

c) *Dealing with questions too easy or too hard.*—It is taken for granted that instructors can avoid the question asked to start him talking, to the great relief of some student dreading any such effort on his own part. There are many questions, however, which seem to the instructor to be too easy because they have just been answered in the preceding discussion, or for some other reason. He must be careful in deciding that such a question is too easy to be worth attention because what seems easy to him is often difficult for the class or it may be based on some previous principle not understood, and he may destroy the habit of asking questions by making the mistake of disregarding those he thinks too easy. The best way to decide the matter is to refer the question immediately to some other member of the class for answer.

Then there is the question which is too difficult for the class because the student asking it is more advanced than other members of the section or because it needs more preliminary study before it is taken up in due time in the course. It is probably best to defer answers to such ques-

tions or to refer the student to a proper source for an answer which he will present to the class at a later date, being assured that the matter is important and is to be considered in a few days. This avoids a discussion over the heads of the majority of the students.

*d) Repetition of questions asked by students.*—Do not repeat questions asked by students. If the class cannot hear, either they or you will request a repetition. The instructor desires especially to promote free discussion between members of his class, but if he repeats their questions their attention will be centered upon him rather than on the student who asked the question, and in all likelihood the answers obtained will be directed to the instructor, who already knows the answer, rather than to the student who wants to know it. It is usually true that students will recite better when assisting a fellow-student in difficulty than when called on by their instructor.

*e) Questions should be asked of fellow-students.*—The next requirement, then, is that questions asked by a student should be asked of the class rather than of the instructor. (1) It is often a good plan to require a student in the front of the class to turn about and face the class when asking questions. (2) If one student is reciting and another desires to ask a question, he asks the question of the student who is reciting and expects the latter to answer him. If this fails, the question is referred to a member of the class. The object of such a method is to have students working together and for each other. It does not mean that the teacher shall stop working altogether. As a matter of fact this idea of a successful recitation lays down a difficult task for the instructor in that he must not only succeed in arousing the interest and stirring up the active thought of the class, but he is always in a position to control the discussion, to keep it out of byways and from "going to seed," to terminate

it when necessary, to act as a reference library, and always to judge of the value of the work that is being done. The point is that the students are working. If the class consists of fifty men and all fifty are at work, asking questions of each other and adding their thought to his, it is obvious that much greater results will be obtained than if the instructor is doing most of the work.

f) *How to obtain good questions from the class.*—Since the questions asked by students stamp the quality of instruction, the principles of teaching of course apply to the ways of obtaining good questions. (1) For example, first, throw the emphasis of instruction on the class as suggested in the preceding paragraph, and develop the habit of constantly watching the way in which the class is working rather than of thinking during the recitation of what you are going to do or say. (2) Expect the class always to judge the soundness and the worth of any statement made at any time. The student who simply accepts a statement as true because somebody says so is no student. Ask such questions as “Do you agree?” “Does anyone differ?” or “Would you like further explanation?” Even when studying the drill regulations ask, “Is that the best method? Why?” The result will be much clearer thinking on the part of the class and a corresponding increase in valuable questions. (3) Leave a problem with the class for study. When the assignment contains such a task in which the group is interested, the members will appear with a number of conclusions and questions for the next recitation. (4) Differentiate between good and poor questions. One way to do this is to take a question asked by a student and make it the assignment for the next period. One class in motors was studying the construction of internal-combustion engines, and the illustrations showed these cast *en bloc*. A student asked, “What is the reason for casting

engines *en bloc?*" Only a very partial answer could be obtained from the class, so this question was made one of three parts of the assignment for the next day, and proper references for study were given.

### 3. Answers

The foregoing discussion of questions has naturally covered to a considerable extent the kinds of answers an instructor desires and how he goes about getting them. There are some ideas, however, which relate directly to answers and which are worth attention.

a) *Mechanical requirements of good answers.*—(1) An answer must be heard and understood by all members of the class. Any member who does not hear or who desires further explanation of the answer should be encouraged to ask at any time for what he wants.

(2) Answers should be grammatically correct, and the instructor can aid in this by using good grammar himself and by insisting upon its use by students whose answers are not clear.

(3) It is often necessary to point out the difference between answers which cover the question asked and those which go all around it without really answering it at all. This defect is often due to a misunderstanding of the question. In such a case the instructor should point out the gist of his question so that the student may give a more satisfactory answer, but if the question was asked by a student the answer should be referred to him for acceptance. Even when an answer is accepted by a student, however, it is often well for the instructor to make certain that his difficulty has been cleared up by asking him further questions, especially since students are inclined to accept any answer of their fellows whether complete or not, and such a test tends to develop judgment of the value of statements of all kinds.

b) *Memory answers*.—The kind of answer will depend to a large extent on the kind of question asked. One class of answers may be called memory answers. Such answers show the exact knowledge of students and include definitions, the nomenclature of the parts of a piece, etc. They require little time, should be given quickly, and must be concise, exact, and admitting of only one meaning. Definitions especially require considerable attention. When a student is called on to define mil, for example, his definition should not begin with the words "It is when," a common error. Instead he should begin by saying, "A mil is a unit—," and continue with an exact statement of what it is, following the verb "is" with a noun and its modifiers. Definitions are the basis of exact knowledge and of clear statements, and unless the student can think of a better substitute, an unlikely event, he might as well learn the exact definition laid down in the drill regulations. An occasional drill in memory answers is very invigorating, in which the instructor requires a number of definitions, names of parts, etc., in rapid succession, passing directly from one student to another without waiting for the man who hesitates. Such drills are not continued over long periods.

c) *Thought answers*.—The second class of answers may be termed "thought answers," usually requiring more time than memory answers. It is necessary for the instructor to remember that any idea which a student thinks of for himself appears to him as a discovery, and it is his own discoveries that make his work worth while. The good instructor is always on the alert for such ideas, because it is by appreciating just such thoughtful work that a whole class is taught to understand what individual study means and what their own possibilities are.

One of the best instructors the writer ever had is Professor McMurry, of Columbia University. He will always

remember the first recitation in this class. After studying the text very carefully, I was called on and for answer quoted almost word for word what the text had to say on the subject, feeling very well satisfied with my statement. The instructor asked two questions which showed me that I really did not know anything about the subject but was merely quoting someone else's ideas. The questions were not asked in such a way as to discourage me, but when I sat down I appreciated thoroughly that I had not assimilated the reasons for the answer given. I did not recite again in that class for some time. Finally in my studies a question came up which I was unable to answer, so I looked up various references and talked to other students about it and then thought out my own conclusions about the matter. Then one day Professor McMurry asked this very question and requested volunteers to answer. I volunteered, but this time I gave my answer in two sentences and decided not to risk any more. The instructor was so alert to the thoughts of his class that he seemed to know at once that I had been thinking about this question, and he would not let me even take my seat but asked me to explain further. This time the answer was satisfactory. Here was the secret of a good answer, the expression of individually applied thought, and with it was discovered the pleasure that comes to a student from developing and expressing for himself what he thinks to be a good idea. Of course the idea may not be new to the instructor, but he shows his ability by drawing it from the student and by giving him the opportunity of presenting and defending it.

This kind of answer is what is meant by a thought answer. The illustration shows that students often need encouragement in giving answers of this kind. The instructor may ask, "What do you mean by that?" or "Can you make your meaning clearer by an illustration?" or "Do it

and show us just what you mean." He must be alert to aid in this way when the student is unable to complete his answer, call on some other member of the class to amplify it, and if possible reduce it to a definite and concrete form. It may be necessary to defer the completion of the answer to the next recitation. Since this is the kind of answer most desired from a group of students, it is the primary object of a considerable part of the work of an instructor.

*d) Repeating answers.*—Do not repeat answers. If the instructor does this, the class forms the habit of speaking to him. This tends to prevent the class from paying close attention to each other. Many officers conducting recitations obtain the same undesirable result by saying "Check" every time they agree with the answer given, and often one can see the face of a man just ready to ask for further information or to raise an objection change to an affirmative expression simply because the teacher agreed. Answers are primarily for the consideration of the group of fellow-students who are working together on the same subject, and the reaction of this group toward any answer is secondary only to the work of the individual reciting and is the best test of the recitation. The instructor can often tell by watching the faces of students whether they understand, or agree, or differ; and instead of helping the recitation by suggestions to the man reciting, he usually accomplishes more by calling on the doubtful student for his question and having the first man explain to him his difficulty. In a class so conducted one of the highest forms of praise would be a complete silence after the recitation is concluded, showing that both students and teacher have understood the recitation and found it to satisfy all their questions; and the next best form of praise would be a number of questions from all parts of the room.



## CHAPTER V

### DRILL

In army instruction the value of drill is recognized in many ways and it is especially emphasized in the maneuvers of dismounted and mounted troops, in firing with arms of small and of large caliber, and in many similar activities. Obviously drill varies in its efficiency and a discussion of the elements of successful drill may be of value. "Practice makes perfect" is an old saying, and certainly correct practice improves skill. Repetition, however, is not the only requirement for successful results.

#### 1. Correct practice

In the first place, wrong practice is worse than no practice. This is illustrated by the fact that during the past war constant comment was made by commanding officers on the improper saluting in the army, and this was extremely difficult to change because improper practice had made incorrect salutes a habit, especially in some organizations.

#### 2. Prevent errors by a correct copy, desirable to imitate

Perhaps the best means of preventing errors in drill is to present a correct copy to the class. The purpose and meaning of the copy must be clear and definite, and definite instructions to the beginners must precede its presentation, so that they know exactly what is expected of them.

For example, when teaching "Squads Right," a selected squad is used to demonstrate the movement. Form the learners in two ranks, have them count off and form squads,

and require each man to watch the movement of his number in the exhibition squad. After front and rear ranks of the special squad have executed squads right separately, then together, have the beginners execute it a few times, and then call on individuals to tell what they did. Often their replies are almost in the words of the book, which they have not seen. Then have the class change places, count off, and repeat the process throughout. In a short time all will be executing the movement correctly and will be able to explain it.

In addition to having the class know just what the copy is for and what they themselves are to do, it is necessary to have the copy one desirable to imitate. Men on exhibition drill, when well selected, take pleasure in their work and their snap and vigor inspire emulation. A very excellent copy of work in tactics, in mapping, and in other subjects has the same effect. As a copy for just such a purpose the moving pictures developed by the General Staff have very great value and their use shows immediate results.

### **3. Concentrated attention**

To get best results from drill, the learner must think about what he is doing. This is one reason why questions were asked of individuals learning squads right above. Some suggestions as to how to obtain close attention will lead any instructor to think of many others of value. (a) Drill should be quite vigorous and should be interspersed with short rest periods. (b) Variety in drill aids in holding attention, while a constant repetition without variations tends toward the opposite result. In perfecting a movement, continue at it for a time, change to something else, then return to it; and even the same movement may be continued if used

in different situations. (c) Selecting students to criticize units adds to alertness. (d) Catch schemes such as "Simon says" or "Grady says" are often used for the same purpose. (e) Attention is much better concentrated on any drill whose purpose is clearly defined in the minds of students. (f) In short, practically all the discussion of drill in this chapter emphasizes the value of attention in drill.

#### 4. Mental attitude of the student toward drill

Many officers who trained troops during the world-war are witnesses to the effect of the mental attitude of the men upon the success of their efforts. A senior instructor of one brigade stated recently that this was 90 per cent of his work and required such agencies as the following: an organization to collect bills due troops at their homes and to arrange for credit for their families, etc.; special efforts of the morale branch in the line of entertainment; cooperation of chaplains and others in learning private troubles and arranging them; and many others. With most of the private worries out of the way, attention to proper methods of drill almost invariably showed surprising results. Even under these circumstances, however, where there was a special incentive in impending action, drill often became monotonous and in a longer period tended to be looked on with antipathy.

The principal purpose of drill is the formation of correct habits. Some leading psychologists maintain that any act which brings pleasurable consequences tends to become a fixed response or habit more readily than one which is followed by unpleasant results because of certain physiological effects on the brain. Other psychologists reject the idea of these physiological effects, but they agree that pleasurable consequences make drill more perfect because

they induce further drill on the part of the individual. In either case it seems certain that it should be the plan of the instructor to connect drill with pleasurable consequences so far as possible in order to get best results, especially to connect successful work in this way. This is frequently done and is not contrary to the idea of discipline.

One source of pleasure in any kind of work is a personal feeling of success and progress. One means of obtaining this feeling in classes is by posting a report of the progress of the section, squads, or individuals, preferably in a graphic form, with a clear statement of the standards to be attained to advance through the various grades of development. Some such suggestions are made under the discussion of marking. The more definite the standards for self-judgment, the better the individual can measure his progress. It is partly for this purpose that qualification as expert rifleman, first-class gunner, etc., should be offered every man, and a list of those qualifying should be posted, together with a statement of requirements for qualification. Such definite ways of judging are needed in different stages of progress in all subjects.

A second source of pleasure from work is some external recognition of progress, expressing appreciation of success by others than himself. A valuable way of doing this is to provide for men to complete different phases of their drill when they have become expert in them. For example, when a man has completed the requirements for Semaphore, he should "pass" to wigwag; the school of the squad should be completed for the the school of the platoon; and only occasional reviews of subjects passed would be required. Here again requirements for advancement should be very definite so that each student can judge his own progress. Other ways of expressing appreciation of real success are

numerous, and those are more valuable for drill which are based on a definite standard of accomplishment. Such standards need to be developed in different subjects.

Other details of the proper mental attitude toward drill are discussed in the various paragraphs of this chapter.

#### **5. Begin drill with the simpler and fundamental elements**

The habits formed at first must be exact, for example the correct position of the soldier at attention or the positions of the hands and arms in signaling. The fundamentals must be developed deliberately and with patient attention to detail. Here the model is used frequently and with careful precision. Later complex developments will then be easier because the basic elements have become habits and need little attention on the part of the student.

#### **6. Drill must be individual**

Attention to individuals is the basis of economical drill. Pick out individual errors for correction. In large classes have the corporals rate the performance of the individuals of his squad or the sergeant of his section; in other cases use methods like those suggested in chapter ii for judging individual differences; and use the results for the selection of individuals for certain kinds of treatment. Poor men retarding the whole class should be picked out and given individual instruction by someone well qualified. Never drill a few men at the expense of a large group. Experts should likewise be picked and should be advanced or given special recognition as drillmasters, etc.

#### **7. Habits formed best in definite situations**

The object of drill is to form habits. This is accomplished best by drill in definite situations. For example, it is desired of officers and men that military courtesy become

ingrained. This is accomplished by practice in definite situations. A superior officer approaches and all come to attention and salute; practice in reporting in different situations is repeated. Attention to such details forms the habit desired and it could not be formed in any general way. The same demand for definite situations for practice can be made of instruction in tactics in which one real section of terrain after another is occupied and the proper evolutions executed in each case, ending in the proper reactions and solutions in new cases. Even one simple reaction is only a habit in a few situations unless it has been practiced in many situations. The use of problems in drill is important both to make it interesting and to make it general.

#### **8. The instructor an example of results**

Finally the instructor should be an example of the results desired in his men to carry out most successfully the requirements for success in drill.

## CHAPTER VI

### PLANNING A RECITATION

#### 1. Necessity for planning recitations

When an instructor applies the principles of teaching so far considered, he may find that the recitation periods are passing very quickly and that part of the work to be covered is in danger of being omitted for lack of time. When a course is laid out, it is planned to cover a certain amount of subject-matter. Such a course is grouped into various main topics; the instructor must consider how much time each topic will require and assign to each recitation period a fairly definite part of the topic. Each hour, then, requires a plan in order that all parts of the subject may be thoroughly studied. In addition to this, the principles of teaching call for a plan. The way of presenting work varies with different classes; the work of the preceding period must be considered; and it will not do to depend on the inspiration of the moment for the best pivotal questions or for good illustrative material and references. So many beginners obtain good results in teaching because they feel it necessary to plan their recitations, while many experienced instructors grow stale because they miss the freshness and interest which come from a little forethought.

#### 2. Elements of a lesson plan

A plan must first consider the ground to be covered during the recitation period. This naturally falls into three parts, the review, the advance, and the assignment. A definite section of the time should be allotted to each part. At times a recitation may be all review, at times all

assignment, as when a complete period is taken up in considering the next few days' work, but usually all three parts are included in one recitation period.

### 3. The aim

Each day's recitation must have a definite aim or object, and this object determines the arrangement of subject-matter and the length of time for each part. The aim is the basis of the lesson plan. It should be comprehended by the class, should be specific rather than general, and applies to the "why" and the "what" of the lesson, not the "how."

The following are examples of aims in recitations:

a) *Materiel*.—To learn nomenclature of the traversing mechanism and obtain practice in disassembling and assembling it.

b) *Care of horses*.—To discover clearly the fundamental points considered in the selection of horses for artillery.

c) *Dismounted drill*.—To increase the carrying power of the voices of students in giving commands and to perfect certain maneuvers.

d) *Mathematics*.—To make clear the method of analysis of a problem, especially emphasizing care in discovering its meaning and ways of forming an equation.

### 4. Method

Having the aim of the recitation in view, the methods of attaining it are considered. Methods in the lesson plan must be detailed, so that they include important questions to be asked, illustrations, references, practical problems, etc., and these arranged in sequence.

The following methods have been used for the aims stated in the preceding paragraph:

a) *Materiel*.—Class of twenty, assign four men to each gun, guns in circle around instructor; groups dismount



traversing mechanism as instructed, each part named as dismounted and placed in regular order on paulin; review nomenclature by naming parts and calling on individuals to hold them up, then by holding up parts and asking groups for names; reassemble parts; return tools.

b) *Care of horses*.—Have an artillery horse on hand; weigh him and compare with standard weights for artillery horses; height, relation of height to weight; general indications of quality in hair, bones, joints, head, feet; action shown and criticized; general study of various parts of the horse, head, neck, shoulders, withers, etc.; tests of temperament. Follow by short quiz asking only for nomenclature of parts.

c) *Dismounted drill*.—State purpose to class. Review, select student officer to stand at distance of 100 yards and give the following commands, the last five repeated forcibly by the class before execution (10 min.); second student drop from ranks and march company to position of first, giving following commands at that distance, commands, then repeat with group giving commands before execution (10 min.); like maneuvers by two other students giving the following commands: (1) ——, (2) —— (20 min.); company marched to east side of field, facing east, to be moved by four commands to a definite position by sixth student (10 min.); instructor takes command and tests for maneuvers indicated in the aim (10 min.).

## 5. Summary of conclusions

At the end of the period it is necessary in most recitations to have the class sum up the outstanding conclusions reached in the lesson. For example, in the materiel lesson above, this was done by asking the following question: "Trace the action of the traversing mechanism from the turn of the handwheel to the movement of the cradle."

A definite summary of this nature is of great benefit in all subjects because it fixes clearly the main points to be remembered and assists students in review and in organizing their work.

## **6. Review**

An important part of the student's work is to remember much of his course. The best way to remember a problem once solved is to repeat it occasionally in some form or another. The instructor may be sure that the class must repeat and repeat again, and then he is often astonished that after the third or fourth time the principles he thought clearest and best fixed are not even understood by some of the students. The lesson plan must provide definite time and definite material for review. Usually it is best to have a few minutes of review at the beginning of the period to sum up salient points in previous lessons which bear on the day's advance. The preceding paragraph pointed out the need for a review at the end of the period, in which students state the things that stand out boldest in the recitation. The successful instructor prepares certain review questions for the day as carefully as he plans the method for advance work, and in records of work kept in such units as those of the R.O.T.C. the review should be included with the advance and the assignment.

At the conclusion of a main division of a course—for example, after studying the 3-inch battery in materiel—a complete period of oral review is advisable, probably followed by a written quiz. For general reviews of this nature the advantage of having an outline of the course in the hands of the class is obvious, and this is one reason for placing before students such an outline either at the beginning of their work or during its progress. A plan for review which often brings excellent results is to prepare a set of questions

covering much of the course, give them to the class in mimeographed form, and then select examination questions from the set. If the questions are well selected they provide for adequate review, and the last suggestion insures careful attention to them.

## 7. Assignments

Perhaps teachers fail more in giving assignments than in any other part of their instruction. This is due to a lack of appreciation of the importance of assignments. The primary purpose of this part of the lesson plan is to show students how to study the advance. Most students do not know how to study. Hundreds of graduate students have said that they never learned how to study until they had finished their college work and had started on professional graduate courses. For this their instructors are largely to blame.

*Good study includes several important parts.*—(a) It is necessary for the student to know exactly what the assignment is, and it is best for him to write down clearly the material it includes. (b) Like the recitation, the results of study depend on the aim for that particular day's study, or on the problem in mind. For example, if the class is to find out methods of doing certain things, its attention will be centered on how they are done rather than the results of doing them. No assignment is satisfactory unless it impresses clearly on the minds of the class the aim of their study for the next day. (c) Study calls for an organization of the subject-matter, often termed skeletonizing the subject-matter. This means the grouping of minor topics about the few main topics suggested in the material. Textbooks are usually divided into paragraphs, each with its own heading, but these paragraphs are minor topics which need to be collected in support of the main ideas in the

lesson. Students need help in organizing their study material, and the assignment provides for this. It is usually done by pointing out the one, two, or three main problems to be solved or major ideas to be considered; sometimes by showing in addition the parts of the text dealing with each topic; and sometimes by leaving to the class the task of so selecting the subject-matter. For example, in studying equitation the use of the aids is being covered theoretically and practically, and the assignment presents the problems, "What aids would you use in jumping, and why?" "What difficulties do you meet in turning on the forehand and how are they overcome?" "Prepare a rating scale for marking the members of this section on their seats." (d) Individual study requires a judging of the value of the subject-matter, not only in organizing it, but also in deciding whether it is true, whether it is well stated, whether it applies to the aim of the lesson, etc. This faculty is developed in the recitation. (e) Study is not complete when it simply includes the ideas of the book, but this must be supplemented by one's own ideas and experiences. For example, "This is different from the way I did this yesterday. How does it differ? Which is better?" Or, "According to this, a regiment takes so many minutes to get under way. How far could we go in a morning?" The questions of the instructor in class will call for such supplementary thought, and the assignment includes questions requiring it. (f) Remembering certain ideas or facts is an important part of study. The assignment suggests some parts to memorize.

The time spent by a student in study is as important as that spent in class. Usually a few minutes spent at the conclusion of a period in bringing out a problem or two to be answered in the coming work, as indicated above, makes the difference between successful study and poor study.

*Form of assignments.*—Assignments are made in many forms. In some of the training camps during the war it was found that certain subjects were not thoroughly covered, that many sections fell behind the schedules of instruction, and that men needed more aid in their study. To meet this difficulty, printed assignments were prepared for each day's study and a copy given to each student at the end of the recitation. This material was required because most officers had so little time to prepare assignments, the subjects were so condensed that the recitation was crowded, and many officers were not sufficiently able to prepare assignments even with time. The printed copies consisted usually of a set of questions or of problems to be answered from the text, many questions involving considerable individual thought. The following is an illustration:

CONDUCT OF FIRE. STUDY ASSIGNMENT

Second week, first hour. Pars. 1155-58, 1196, 1207, F.A.D.R.

Aim: Understanding of parallax and the effect of obliquity, and a clear idea of deflection in preparation for firing data.

1. How many mils in  $30^\circ$ ? How many degrees in 1,000 mils?  
*Ans.:*  $533\frac{1}{3}$  mils;  $56\frac{1}{4}^\circ$ .

2. Define parallax. Compute the parallax of 400 yards at a point 2,500 yards away on a perpendicular.

3. Define obliquity. Draw a circle indicating the limits of the obliquity factors, no interpolation.

4. Compute the parallax in question 2 if the point is 800 mils to the right of the perpendicular.

5. Show by diagram one gun in position (*G*), a target (*T*) 2,000 yards away, an aiming point (*P*) 5,000 yards to the right rear, and an observing station (*BC*) 500 yards to the exact right of the gun. Which angle is larger, *PGT* or *PBCT*?

6. By parallel lines construct an angle at *BC* equal to *PGT*.

7. What is deflection? From what is it measured and in what direction?

8. How close to their computed values are the initial deflection and deflection difference usually sent to the guns?

This assignment prepares for computation of firing data in class.

Whatever the form of the assignment, whether a brief glance over the new work, or an oral problem, or oral questions to be settled by study, or written material of some kind, it should contain a definite aim, a suggestion of organization, and a demand for actual application of the material in some way. It requires a definite time in the lesson plan and is worth careful preparation by the instructor.

### 8. Summary

A complete lesson plan will probably take the form indicated below:

#### A. Materials covered in the lesson.

1. Review. (— min.).
2. Advance. (— min.).
3. Assignment. (— min). In detail.

#### B. Outline of the lesson in detail.

1. Aim.
2. Method. (Details of review of advance.)
3. Results. (Instructor's idea of success of lesson.)

It will assist the class to know the plan of the recitation, since this increases their interest, helps them to remember important ideas, and shows them how to study.

## CHAPTER VII

### MARKING, GRADING, OR RATING

#### 1. An experiment in grading done by officers

Finding that the marks in conduct of fire given some 8,000 students in one training camp varied enormously between batteries, and that some grades were much too high and others as much too low, the writer tried the experiment of assembling all instructors of the subject and giving them a single set of answers to grade. The paper to be marked consisted of ten answers to a test handed in by a candidate, each answer valued at 10 per cent for correct and most of them simple computations. Each question was carefully considered by the group of instructors, the correct answer determined, and a value set on each part of an answer, so that every precaution possible was taken to obtain uniform grading. Each answer was discussed and marked before taking up the next, and any question as to errors was answered. The rating was done independently by each instructor. The resulting grades were distributed as shown in the graph on page 52.

a) *Reading the graph.*—Numbers below the graph indicate grades by percentage, numbers on the left indicate number of officers giving any grade, and the numbers on horizontal lines of the graph indicate definitely the number of officers giving the grade immediately below, which number is represented graphically by the height of each line above the base line. The graph may be read as follows: (1) grades on the one paper varied from 43 per cent to 88 per cent; (2) it was rated at 43 per cent by one officer,

at 44 per cent by two officers, etc., at 62 per cent by forty-two officers, etc.; (3) since there were four hundred and five officers, the middle or median grade is the 203d in the line, and the 203d grade falls in the group rated 62 per cent, so that practically as many officers gave a grade

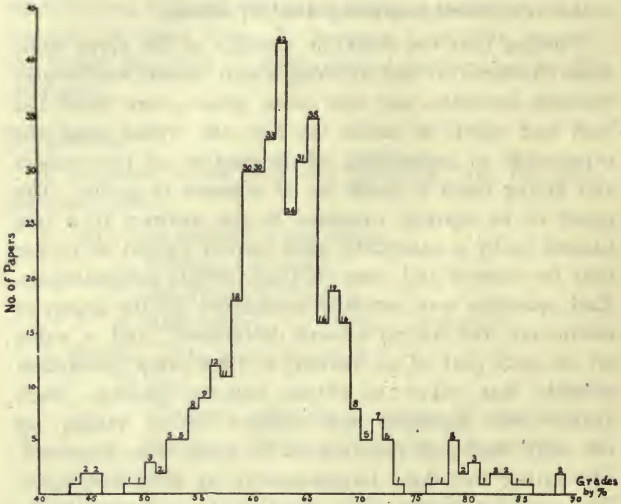


FIG. 3.—Distribution of grades given by the same test paper in conduct of fire by four hundred and five officers.

above 62 per cent as below 62 per cent, which is the median or the middle grade; (4) two hundred and twenty-seven papers, or 56 per cent of the total, fell between 59 per cent and 65 per cent, inclusive, or more than one-half were within 3 per cent of the median grade, while between the grades 55 per cent and 70 per cent, a variation of 16 per cent, there were 341, or 84 per cent of the total papers; (5) the



error as often exceeded as not, or the "probable error," was  $3\frac{1}{2}$  per cent.

b) *Conclusions from the graph.*—(1) The wide distribution of grades shows that there is a great variation in marking even in a case apparently so simple. A special study of grades given by field officers in the group showed a variation almost as great. Evidently, then, the subject of grading needs close attention.

(2) The close grouping of such a large percentage of grades about the median is unusual. Most similar studies of marking show less grouping and a larger probable error, running from 5 per cent to 9 per cent. In this case the grouping was probably due to the unusual precautions taken in marking, which tends to show that it is possible to train most officers to grade fairly evenly by careful instruction in marking.

(3) In view of the care taken in this case, however, it seems true that it is probably impossible to obtain uniform grading with such a scale as the one used, namely a 100 per cent or one-hundred-unit scale.

## 2. A comparison of scales of fine units and of coarse units

The paper in the experiment above was rated on a 100 per cent scale and the final grade given in units of 1 per cent. Let us see what would have been the effect of grading each question as before but expressing the final mark in terms of a coarser scale, such as is usually indicated by the letters *A*, *B*, *C*, etc. The following table shows exactly the same marks as were given in the experiment above expressed in terms of the scales indicated below.

a) *Conclusions from table.*—(1) The coarse scale *A* would have resulted in 82 per cent of the instructors giving the same grade, *C*, or Fair, and consequently in a greatly decreased variation. If *D* had been taken as Failure,

9½ per cent of the officers would have so marked the paper. (2) The second scale, B, shows a wider variation, with 63 per cent of the instructors giving D and 25 per cent giving E, a total of 88 per cent for the two. If grades below 60 per cent were considered Failure, 27 per cent of

## RATINGS EXPRESSED ON A COARSER SCALE

## SCALE A\*

| Grade   | Per Cent Value | Rating         | No. of Papers | Per Cent of Total |
|---------|----------------|----------------|---------------|-------------------|
| A.....  | 86-100         | Excellent      | 2             | ½                 |
| B.....  | 71- 85         | Good           | 8             | 8                 |
| C.....  | 56- 70         | Fair           | 332           | 82                |
| D.....  | 41- 55         | Poor           | 39            | 9½                |
| E.....  | 40 and below   | Failure        | 0             | 0                 |
| Total.. | .....          | .....          | 405           | 100               |
| SCALE B |                |                |               |                   |
| A.....  | 90-100         | Excellent      | 0             | 0                 |
| B.....  | 80- 89         | Very good (G)† | 12            | 3                 |
| C.....  | 70- 79         | Good (Fair)    | 27            | 7                 |
| D.....  | 60- 69         | Fair (Poor)    | 256           | 63                |
| E.....  | 50- 59         | Poor (Fail)    | 103           | 25                |
| F.....  | 49 and below   | Failure        | 7             | 2                 |
| Total.. | .....          | .....          | 405           | 100               |

\*Scale A uses units corresponding to 15 per cent in the original experiment.

†Words in parentheses indicate ratings often given the preceding grade.

the officers would have so marked the paper. (3) It is evident that a coarser scale means more uniformity in marking a single paper. (4) While a very fine scale tends to too great variation among instructors in marking, it may be that one too coarse will not indicate closely enough the differences between the various individuals in a class. Evidently the scale can be either too fine or too coarse.

b) *General opinion.*—A number of prominent educational investigators have published results of studies of marking systems, and the consensus of opinion is that when marking work in this way the minimum size of the marking unit should be about 10 per cent, though a few say 5 per cent, and that there should be about four such units above the failure mark. The failure point varies with type of subject, of instruction, of text, etc. The two illustrations show failure at 40 per cent and 50 per cent, respectively, standards often used in the army. At any rate it is the growing tendency to mark with such coarser units and such a system may well be adopted by any instructor.

### 3. Objective rating scales

With reference to grading, the most pronounced tendency in the educational field today is toward objective scales for rating qualities or knowledge. The greatest cause of this tendency is an effort to reduce the variation in marks due to the personal differences of instructors. These scales are usually quantitative, so that higher marks are obtained by doing more work, as illustrated in the Curtiss scales for arithmetic, the variation in quality being provided for by variation in types of work in the different parts of the tests. Other tests, like the Thorndike Writing Scale, are almost entirely for the quality of work done. It is impossible to discuss such scales here. The psychological rating tests used in the army during the war and the universal rating scales for the essential qualities of officers were the beginning of efforts in this direction in our service.

a) *Illustration.*—Efforts toward objective rating scales for different subjects taught in the R.O.T.C. are of interest. In one unit the sections in materiel were given a list of some five hundred parts which they should be able to name and locate, and thirty-three questions on design, operation,

ammunition, etc., which covered the course. The five hundred parts counted 50 per cent of the whole, so that a single failure in one of them cost  $\frac{1}{10}$  per cent; the thirty-three questions counted 50 per cent, so that a failure on one cost  $1\frac{1}{2}$  per cent. The whole scale was used for testing a student or a section, and fairly absolute results were obtained, since the part touched was either right or wrong, whatever the personal attitude of the instructor, and an error in a question made it incorrect. For a section of ten students, each man was simply asked fifty of the five hundred parts, each valued at 1 per cent, and three of the thirty-three questions, each valued at 17 per cent, the men being taken in rotation. Suppose one man answered correctly thirty-five of the fifty parts and two of the three questions, his grade would be 35 per cent plus 24 per cent, or 79 per cent, and his rating would be C. This is the beginning of an objective scale of a quantitative nature. Such scales should be made of parts of equal value or difficulty and the answers should admit of exact grading, that is they are either right or wrong. Their development in the army is a matter for the future.

b) *Advantages.*—(1) One of the main reasons for objective rating scales was stated as the necessity for removing as far as possible the personal variation in marking. (2) A second reason of great importance is that such a scale furnishes the student with a measure of his own advance. Among the obvious advantages of this are increased interest, a clearer knowledge of what he is working for, and a satisfactory basis for considering his own work independent of the ideas of the instructor. (3) A third reason for such scales is that they enable the student to understand just what his marks mean, bringing him in closer touch with the instructor. (4) Grades so given are much more satisfactory to the instructor for much the same reasons, and

especially because each student can be rated without reference to the work of other members of the class.

#### **4. Variation of marks of students in the same class**

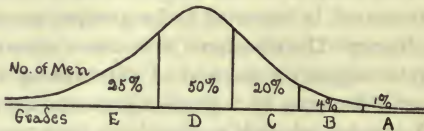
The individual differences of students, discussed in chapter ii, must be considered in discussing the variation of marks which is found among the members of a single class. In that chapter it was suggested that the abilities of students cannot be expected to be grouped so regularly as in the Normal Distribution Curve there shown. The same chapter suggests a method of determining to some extent these differences by a graphic presentation of their grades. A number of such studies have been made. In most cases the curve of ability is high at some one point and the majority of students have ability, so far as could be determined, closely grouped about this point, with only a few showing it to a very much greater or very much less degree. In a few cases the class seemed to be divided into two groups, one showing very high ability and the other rather low ability in the quality tested, and in these cases the curve of distribution showed two distinct high points, or modes, with most of the students grouped about these points and only a few in the area of medium ability between. It seems to be true, however, that an instructor can be fairly certain that when he grades a number of students on one subject there will be a middle mark, near average ability for men ready to take the course, about which the majority of the class should rank. As he becomes better acquainted with his class this will become clearer, so that he cannot only judge the ability of his students by the graph of their marks, but he can judge also of the correctness of his marks by the same means.

The following graphs of supposititious cases show such a distribution of grades and are given for the reasons

indicated in the discussion following them. They may be taken as the records of two batteries working at dismounted drill.

a) *Discussion of curves.*—(1) "A" Battery shows the median grade as D and an even distribution above and below this mark.

CURVE OF GRADES OF "A" BATTERY



CURVE OF GRADES OF "B" BATTERY

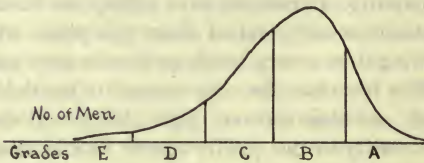


FIG. 4

(2) "B" Battery shows a median grade of B, with comparatively few A's and a gradual decrease to D and E. This curve is "skewed" to the upper end of the scale.

(3) In each battery there is a grouping such as that discussed above. The first curve would indicate that the work is fairly hard for the battery, or that it is indifferent, or that the instructor is probably marking relatively with fairness but with a very high standard, perhaps because the work is just beginning and progress will show a steady move of the mode or high point to the right.

(4) The second curve would indicate that the work is fairly easy for the battery, or that the instructor is inclined

to mark too high, or that the organization contains an unusually large proportion of men of high ability.

b) *Uses of the curves.*—(1) By the instructor. A graphic presentation of marks presents a clear basis for judging whether his marks are fair and for comparison with the work of other instructors and with their standards of rating.

(2) By the supervisor. The inspector obtains the same aid in judging that is given to the instructor by graphic representation of marks. In case of the first curve, he would want to know why the rating is so low; in the second case he would want to know both why it is so high and why it is “skewed” to one side.

(3) Some educators and some educational institutions go so far as to require that marks given by instructors shall conform approximately to the curve shown for “A” Battery. This has been done, for example, in the University of Missouri. The basis for this requirement is that the courses outlined are sufficiently difficult for the great majority of students, and that it is fairly unusual to find a class made up largely of men of great brilliance in any particular subject. For this reason instructors whose marks show great variation from the normal curve are sometimes required to explain the cause for such variation.

(4) Until the subject has been more completely determined, the ordinary instructor will probably be satisfied with a fairly even distribution of grades for his classes, but at the same time he should be able to explain to some extent why he has whatever kind of curve is shown for those classes.

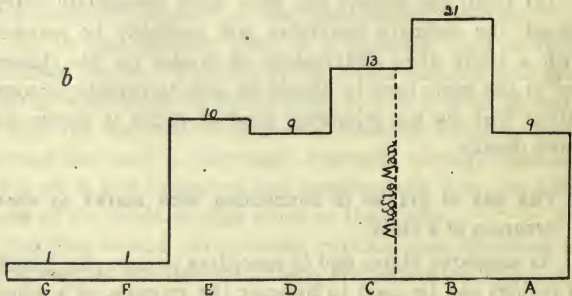
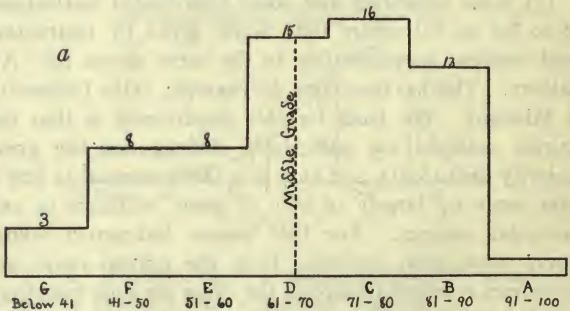
##### **5. The use of graphs in connection with marks to show progress of a class**

As suggested above and in preceding paragraphs, graphs of ratings can be used to indicate the progress of a whole

class as well as to study the individual differences of its members, the standard of rating of instructors and the relative progress of different classes. The following graph was used to study the progress of sixty-four students in a class in field artillery materiel in the R.O.T.C. unit at the University of Chicago. The marks are based on the objective scale for rating knowledge mentioned in section 3, paragraph *a*, of this chapter, which required an intimate knowledge of 500 parts of materiel of different types.

*a) Discussion of graph.*—(1) The first graph shows a wide distribution in knowledge of materiel, with the middle

SERIES OF GRAPHS OF PROGRESS





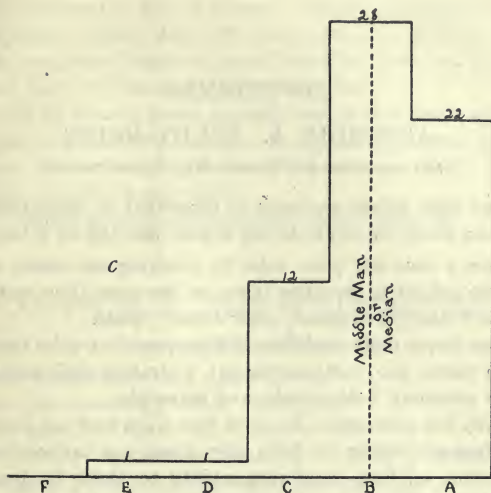


FIG. 5.—Graph showing progress of sixty-four students in field artillery materiel, based on objective scale: *a.* Grades obtained in first test, end of one-third of quarter; *b.* Grades obtained in second test, end of two-thirds of quarter; *c.* Grades obtained in final test, end of quarter.

grade D, which is barely passing in the University, with eight conditioned and eleven failures. The change in the median is noticeable, as is the final grouping toward high marks. Evidently the university students were well able to learn materiel and to understand its uses.

(2) The presentation of successive graphs to the class added considerable interest to the tests and to the work.

## APPENDIXES

### APPENDIX A. STUDY HELPS

[From suggestions to University High School Students]

Good work habits are quite as important as subject-matter. Your aim should be to do the job in less time and do it better.

1. *Form a time and place habit* by studying the lesson in the same subject in the same place, at the same time each day. Don't study immediately after a heavy meal.
2. *Have proper study conditions and equipment*—a quiet room not too warm, good light on the left, a straight chair and table, the necessary books, tools, and materials.
3. *Study independently.* Do your own work and use your own judgment, asking for help only when you cannot proceed without it, thus developing ability to think for yourself, and the will-power and self-reliance essential to success.
4. *Arrange your tasks economically;* study those requiring fresh attention first; those in which concentration is easier, like written work, later.
5. *Sit straight and go at the work vigorously,* with confidence and determination, without lounging or waste of time. When actually tired, exercise a moment, open the window, change to a different type of work.
6. *Be clear on the assignment* and the form in which it is to be delivered. In class take notes when the assignment is made; mark things to be carefully learned. When in doubt, consult the instructor.
7. *In committing material to memory,* learn it as a whole; go over it quickly first, then more carefully, then again and again until you have it. In learning forms, rules, definitions, etc., it will help to repeat them aloud.
8. *In studying material to be understood and digested but not memorized,* first go over the whole quickly, then carefully, section by section; if possible, then review the whole quickly.

9. *Use judgment as well as memory*; analyze paragraphs, select important points, note how minor ones are related to them; use your pencil freely to mark important points so that you may learn systematically and review easily.
10. *Study an advance lesson promptly* and review before going to class, recall memorized matter by repeating it, aloud if necessary; think through a series of points to see that you have them in order in your mind.
11. *Use all the material aids available*—index, notes, etc.

## APPENDIX B. LIST OF REFERENCES

### I. EDUCATIONAL PSYCHOLOGY

- BAGLEY, *Educative Process*. Macmillan.  
 COLVIN, *The Learning Process*. Macmillan.  
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### 2. PRINCIPLES OF EDUCATION

- BAGLEY, *Educational Values*. Macmillan.  
 BOLTON, *Principles of Education*. Macmillan.  
 CUBBERLEY, *Changing Conceptions of Education*. Houghton Mifflin Co.  
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### 3. METHODS AND MANAGEMENT

- BAGLEY, *Classroom Management*. Macmillan.  
 COLVIN, *Introduction to High School Teaching*. Macmillan.  
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 STRAYER AND NORSWORTHY, *How to Teach*. Macmillan.

STEVENS, *The Question as a Measure of Efficiency*. Teachers College, Columbia University.

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#### 4. TEACHERS' MARKS

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———, *Statistical Methods Applied to Education*. Houghton Mifflin Co.

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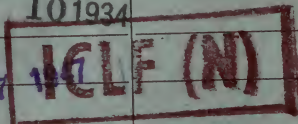
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